

PATENT COOPERATION TREATY

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To: HARRISON GODDARD FOOTE Bellgrave Hall, Belgrave Street Leeds, LS2 8DD GRANDE BRETAGNE

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

137473 05.AUG 04

Date of mailing (day/month/year)	03.08.2004
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Applicant's or agent's file reference AJC/P053064WO			IMPORTANT NOTIFICATION
International application No. PCT/GB 03/01484	International filing date (day/month/year) 07.04.2003	Priority date (day/month/year) 05.04.2002	
Applicant BRITISH NUCLEAR FUELS PLC et al.			

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

5/10/04
 28/8/04

Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Commare, I Tel. +49 89 2399-2883
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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference AJC/P053064WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB 03/01484	International filing date (<i>day/month/year</i>) 07.04.2003	Priority date (<i>day/month/year</i>) 05.04.2002
International Patent Classification (IPC) or both national classification and IPC G21F9/00		
Applicant BRITISH NUCLEAR FUELS PLC et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 6 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 04.11.2003	Date of completion of this report 03.08.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Deroubaix, P Telephone No. +49 89 2399-7592	



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/01484

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1, 2, 4-6 as originally filed
3, 3a filed with telefax on 01.06.2004

Claims, Numbers

1-25 filed with telefax on 01.06.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-2, 5-7, 14-16
Inventive step (IS)	Yes: Claims	
	No: Claims	3-4, 8-13, 17-25
Industrial applicability (IA)	Yes: Claims	1-25
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: GB 1 250 357 (BOEHRINGER INGELHEIM G.M.B.H.) 20 October 1971
(1971-10-20)

D2: GB 865 914 (TURGO PRODUCTS, INC.) 26 April 1961 (1961-04-26)

1. OBJECTIONS AS TO NOVELTY (ARTICLE 33(2) PCT)

Claim 1

Document D1 discloses a method suitable for (see III - 4.8 in the Special Issue of the PCT Gazette as in force from 9 October 1998, of the PCT International Preliminary Examination Guidelines, established by the International Bureau of WIPO) the removal of contaminating materials from pipework, said contaminating materials comprising deposits on the pipework which comprise inorganic salts having low solubility levels, wherein said contaminating materials cause a reduction in the effective internal diameter of the pipes and thereby effect a reduction in the rate of flow of a fluid through the pipework, the method comprising treating said contaminating material with at least one carbamate salt.

The subject-matter of claim 1 is therefore not new.

In addition it should be noted that the deposits to be removed by the method of D1 comprise inorganic materials (see D1, page 1, lines 16-17).

Claim 2

Materials depositing on a pipework are always deposited from solutions or suspensions in contact with the pipework.

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The subject-matter of claim 2 is therefore not new.

Claim 5

The method of D1 is suitable for the removal of contaminating materials comprising partial or total blockages of a pipework.

The subject-matter of claim 5 is therefore not new.

Claim 6

In the method of D1, said carbamate salt comprises an aqueous solution of a carbamate salt.

The subject-matter of claim 6 is therefore not new.

Claim 7

The carbamate salt used in the method of D1 comprises ammonium carbamate.

The subject-matter of claim 7 is therefore not new.

Claims 14-16

The treatment of D1 is carried out in the presence of at least one additive comprising a carbonate or bicarbonate salt, wherein said carbonate or bicarbonate salt comprises caesium carbonate or ammonium bicarbonate.

The subject-matters of claims 14-16 are therefore not new.

2. OBJECTIONS AS TO INVENTIVE STEP (ARTICLE 33(3) PCT)

Claims 3-4, 8-13, 17-25

The features set forth in said claims are merely straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise

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of inventive skill, in order to solve the problem posed.

With regard to pre- and post-treatment with acid and washing with water, see e.g. D2, page 7, lines 51-59 and page 10, lines 1-7.

Thus, the subject-matters of claims 3-4, 8-13, 17-25 do not involve an inventive sep and do not satisfy the criterion set forth in Article 33(3) PCT.

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caesium, iron and uranium. Materials such as these are commonly found as components of waste and process streams in the nuclear industry.

Consequently, the present invention seeks to provide an efficient method for the removal of such materials, and thereby prevent the severe problems which can otherwise be caused as a consequence of the stubborn nature of the deposits that are formed in pipework, and the subsequent blockages that can be encountered. The method is especially directed towards the removal of deposits which are sufficiently substantial to cause a reduction in the effective internal diameter of a pipe, and thereby have the capability to cause a reduction in the rate of flow of a fluid through the pipework. Additionally, of course, the method is required to be capable of dealing with the more extreme situations wherein severe levels of depositions have occurred, such that a partial or complete blockage of the pipework has already occurred. Clearly, such eventualities can cause severe difficulties, and even lead to catastrophic failures, in industrial processes.

In view of the fact that the method of the present invention finds particular application when dealing with pipeline deposits encountered in the nuclear industry, the potentially toxic nature of the wash liquors which result from the cleaning operation are of obvious concern and it is important that safe, clean and efficient methods of disposal should be available for these waste products. Consequently, the invention also seeks to provide a method of removing these materials from pipework which does not lead to the generation of toxic or harmful waste streams or by-products.

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Thus, according to the present invention, there is provided a method for the removal of contaminating materials from pipework, said contaminating materials comprising deposits on the pipework which comprise inorganic salts having low solubility levels, wherein said contaminating materials cause a reduction in the effective internal diameter of the pipes, and thereby effect a reduction in the rate of flow of a fluid

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through the pipework, the method comprising treating said contaminating materials with at least one carbamate salt.

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CLAIMS

1. A method for the removal of contaminating materials from pipework, said contaminating materials comprising deposits on the pipework which comprise inorganic salts having low solubility levels, wherein said contaminating materials cause a reduction in the effective internal diameter of the pipes and thereby effect a reduction in the rate of flow of a fluid through the pipework, the method comprising treating said contaminating materials with at least one carbamate salt.
2. A method as claimed in claim 1 wherein said inorganic salts are deposited from solutions or suspensions in contact with the pipework.
3. A method as claimed in claim 1 or 2 wherein said inorganic salts comprise phosphate, alkylphosphate, molybdate and phosphomolybdate salts.
4. A method as claimed in claim 3 wherein said salts comprise the phosphate, butylphosphate, molybdate and phosphomolybdate salts of zirconium, tellurium, gadolinium, caesium, iron and uranium.
5. A method as claimed in any one of claims 1 to 4 wherein said contaminating materials comprise partial or total blockages of the pipework.
6. A method as claimed in any preceding claim wherein said carbamate salt comprises an aqueous solution of a carbamate salt.
7. A method as claimed in any preceding claim wherein said carbamate salt comprises ammonium carbamate.
8. A method as claimed in any one of any preceding claim wherein said treatment is carried out at a temperature in the range of from 40°C to 60°C.

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9. A method as claimed in claim 8 wherein said temperature is in the region of 60°C.
10. A method as claimed in any preceding claim wherein said treatment is continued for an extended period of time.
11. A method as claimed in claim 10 wherein said treatment is continued for at least 2 hours.
12. A method as claimed in any preceding claim wherein the concentration of said carbamate in aqueous solution is in the range of from 0.3M to 6.0M.
13. A method as claimed in claim 12 wherein said concentration is between 1.0M and 3.0M.
14. A method as claimed in any preceding claim wherein said treatment is carried out in the presence of at least one additive.
15. A method as claimed in claim 14 wherein said additive comprises a carbonate or bicarbonate salt.
16. A method as claimed in claim 15 wherein said carbonate or bicarbonate salt comprises caesium carbonate or ammonium bicarbonate.
17. A method as claimed in any preceding claim wherein said treatment is preceded by pre-treatment with acid and washing with water.
18. A method as claimed in claim 17 wherein said pre-treatment and washing is carried out at room temperature.

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19. A method as claimed in any one of claims 1 to 16 wherein said treatment is followed by post-treatment with acid and washing with water.
20. A method as claimed in claim 19 wherein said post-treatment and washing is carried out at room temperature.
21. A method as claimed in any one of claims 17 to 20 wherein said acid comprises nitric acid.
22. A method as claimed in any preceding claim whenever applied to the removal of contaminating materials from pipework in the nuclear processing industry.
23. A method as claimed in claim 22 which comprises the treatment of pipework used in the processing of Highly Active Liquor with an aqueous solution comprising 0.3-1.0M ammonium carbamate and 0.2M caesium carbonate at 60°C for 2 hours.
24. A method as claimed in claim 22 which comprises the treatment of pipework used in the processing of Highly Active Liquor as follows:
- (a) treatment with 2.0M nitric acid at room temperature; followed by
 - (b) washing with water at room temperature; followed by
 - (c) treatment with 1.0M or 3.0M aqueous ammonium carbamate solution at 60°C for 2 hours.
25. A method as claimed in claim 22 which comprises the treatment of pipework used in the processing of Highly Active Liquor as follows:

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- (a) Treatment with 1.0M or 3.0M aqueous ammonium carbamate solution at 60°C for 2 hours; followed by
- (b) Treatment with 2.0M nitric acid at room temperature; followed by
- (c) Washing with water at room temperature.

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